Unit 17 Denmore Industrial Estate, Denmore Road, Bridge of Don, Aberdeen AB23 8JW

User Manual
Pump In Sub

This Manual Covers the Following Part Numbers:

165-4846-HV0

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Revision History

Issue, Release Date	Description
Rev A, 19 Sep 12	Initial Issue

Safety

WARNING: Trapped air requires considerable time to compress and when it is compressed is highly dangerous. It has enough stored energy to separate parts with considerable force.

All pressure equipment has a particular pressure rating and care must be taken to ensure that no item is used in a situation that may cause its working pressure to be exceeded.

All personnel involved in pressure testing must be formally trained, competent and utilising the appropriate PPE.

Ensure the identification band/plate is fitted and is displaying the correct information as per the Tag Sheet/Index

This equipment and the equipment it is attached to is heavy never position yourself below a suspended load

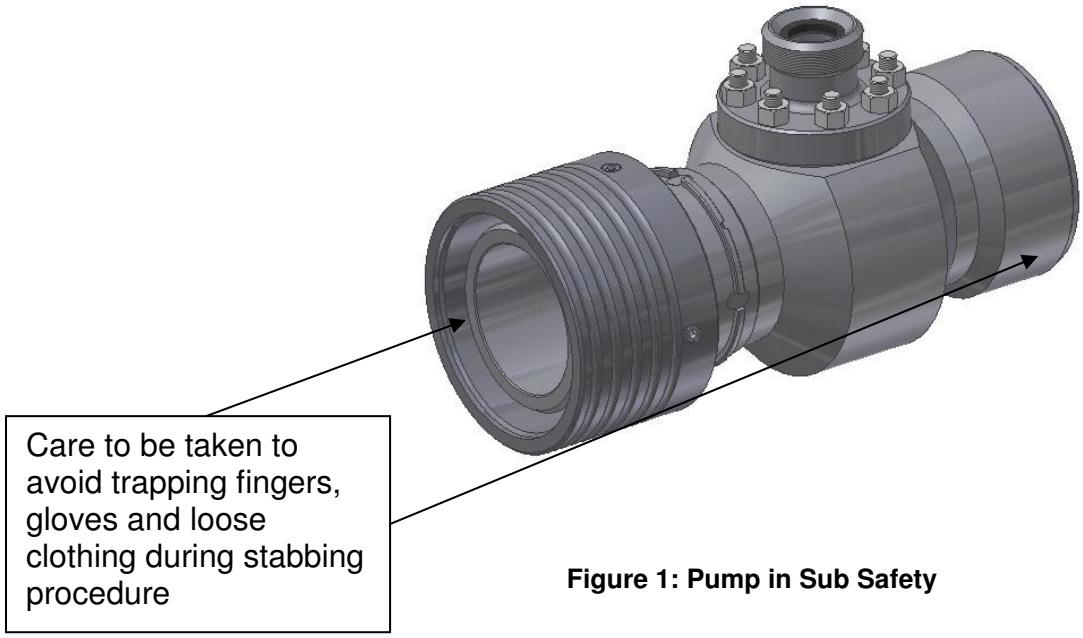


Figure 1: Pump in Sub Safety

1 Introduction

1.1 General

The pump in sub is normally positioned between the wireline valve and the wellhead. Its main function is to facilitate well control by pumping fluid when the wireline valve is closed.

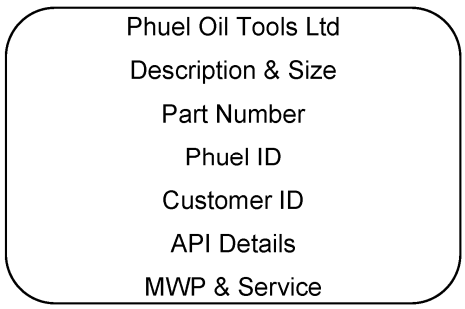
The Phuel pump in sub body is constructed in one piece. The side outlet sub is a standard API BX flange that allows suitable flow connections (2" 2202 weco type in this case) to be attached. The end connections are Otis type with the Phuel safe-lok features incorporated as standard.

This user manual serves as an introduction to the equipment and contains the relevant specifications, operation, planning and maintenance instructions, parts list and drawings.

1.2 Product Identification

Phuel products are identified by a unique serial number that facilitates full product traceability. Each product is supplied with a documentation pack that contains product certification and material/inspection reports. The serial number is always etched on the surface of the product but can sometimes be difficult to find or read after painting. A customer identification number is also included to allow the customer to track the asset in their system.

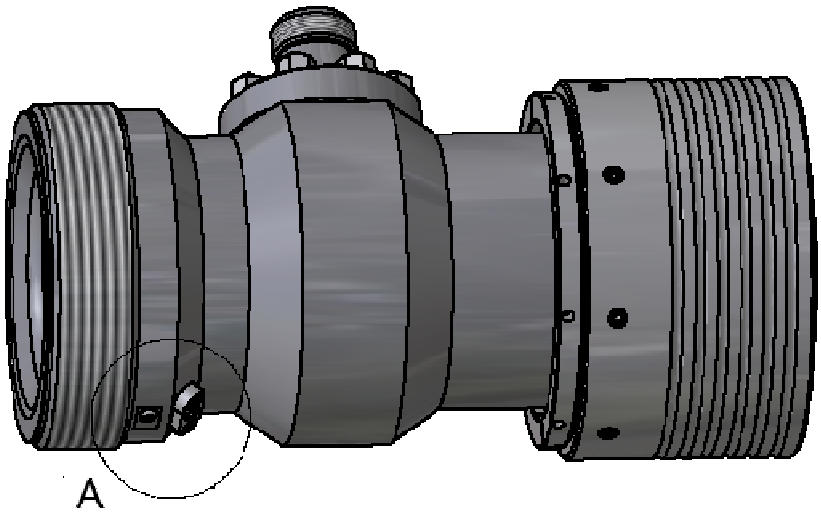
A stainless steel band secures the nameplate tag that is stamped with the information shown below. This tag should be located in the first instance to ensure that this manual refers to the correct equipment.



2 Technical Specifications

Part No	165-4846-HV0
Connections	15”-2 Connection 2’’ 2202 Hammer lug Union
Quick Test Connection	9/16” AEMP
Side Flange	2-1/16” 15M Flange
Maximum Working Pressure	15,000 Psi
Service	H2S
Weight	1131 lbs/513 Kg
Make Up Length	29.23” / 0.74m
Recommended Flange Bolt Torque	319lbft (429NM)

Table 1: Technical Data



For Detail A, Quick Test Facility see over

Figure 2: Pump in Sub

3 Technical Description

3.1 Top Sub Quick Test Facility

The box of the top sub allows a dual seal arrangement typical on Phuel 15-2 pin connections to be tested with an isolated test port connection. The Quick Test Facility provides a single connection in the Riser string that can be broken and then made up and tested without the need to pressure test the whole string, thus reducing the operational time required to install tools in the well. Notice that the Seals are not exposed when the Sub is separated, which helps avoid damage when stabbing back in.

When making up the Phuel 15”-2 connection, the collar should be fully made-up and then backed off a **maximum of a 1/4 turn**.

The Isolation Valve consists of a metal cone seal that is energised against a replaceable peek seat by tightening the valve with a hex key. The Valve should be open (i.e. screw backed out) when testing between the seals and closed (screwed in) when wanting to isolate from the well pressure in the event of a O-Ring failure. The Tamperproof Button Head Screw prevents the full removal of the Valve.

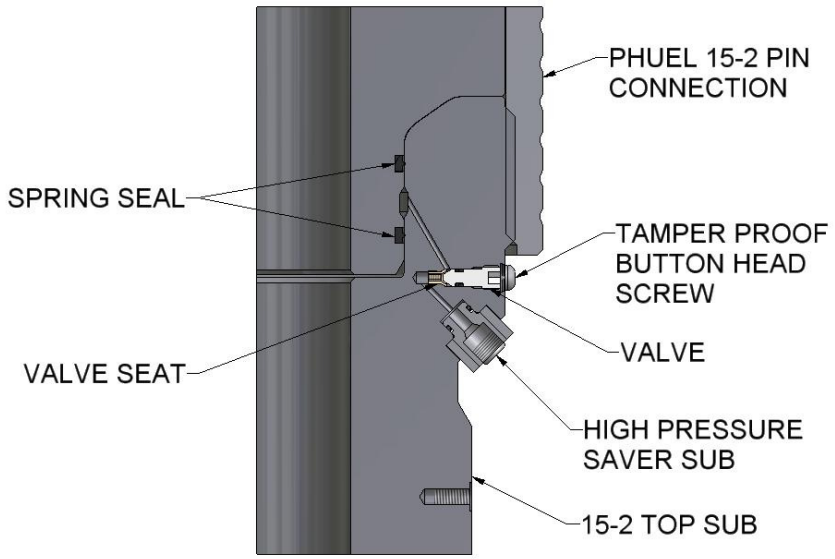


Figure 3: Quick Test Facility

3.2 Flange Crossover

The side outlet sub is a standard API BX flange that allows suitable flow connections (2” 2202 hammer lug union in this case) to be attached

Figure 4: Flange Crossover

4 Operation

All operations to be carried out by suitably qualified and competent personnel

When making up the Phuel 15”-2 connection, the collar should be fully made-up and then backed off a **maximum of a 1/4 turn**.

Once the relevant valve has been connected to the hammer lug union connection the pump in sub is ready for connection between the wireline valve and the wellhead to allow well control

The pump in sub can also be utilised to allow fluid sampling and/or inhibitor injection.

4.1 Pre Job

- Ensure thread protectors are fitted
- Check maintenance record sheet and ensure the equipment has been maintained by competent personnel
- Check all certification is in date
- Confirm information band is fitted and correct
- Ensure equipment is suitable for the maximum working pressures and services involved
- Ensure seals are seated correctly and there are no signs of damage
- Ensure threads are clean
- Inspect for signs of damage
- Pressure test at least to 1.2x the maximum well pressure
- Ensure all connections are tight and that the test port is tightly fitted

4.2 During Job

- Ensure collar lock has operated correctly and the collar is locked in position
- Avoid excessive movement

4.3 Post Job

- Inspect for signs of damage
- Ensure threads are clean
- Ensure thread protectors are fitted

5 Maintenance

All maintenance to be carried out by suitably qualified and competent personnel

5.1 Introduction

Regular maintenance of the equipment using Phuel redress kits or Phuel approved parts is essential to its continued safe operation. Ensure that the pre and post job operating procedures are followed and that maintenance records are kept.

5.2 Schedule

The maintenance schedule may be governed by international or company standards and the following is considered to be the minimum requirements.

5.2.1 Pre & Post Job

Refer to Section 4.1 and Section 4.3 for details

5.2.2 Yearly

- Inspect the condition of all sealing surfaces and surface coatings
- Re-coat threads and sealing surfaces if necessary. If in doubt contact Phuel Oil Tools Ltd
- Replace all elastomeric seals with items from redress kit (see spares)
- Re-grease components
- Re-assemble (see below)
- Pressure test to maximum working pressure
- Inspect paint work and repair as necessary

5.2.3 Five Yearly

- Recertification by Phuel Oil Tools in accordance with DNV-RP-E101

5.3 Redress Procedure

5.3.1 Dis-Assembly

- Remove saver sub and discard seal
- Remove Tamperproof button screw and washer
- Unscrew valve and discard seal
- Unscrew valve seat and discard if replacing
- Remove 4 cap screws and washers from the split collar
- Loosen split rings from collar and remove from split collar. Remove split collar from bottom sub
- Remove hex nuts
- Remove flange crossover and seals
- Remove and discard spring seals from bottom sub
- Degrease and clean all components
- Inspect threads for damage
- Fit thread protectors

5.3.2 Re-Assembly

- Remove thread protectors
- Inspect all threads for signs of damage and clean with wire brush
- Slide the Split Collar over the bottom sub, make up the two halves of the split ring and tighten down until the ends are flush with the collar. Back off slightly to align the holes
- Insert 4 cap screws and washers.
- Fit spring seals to the bottom sub
- Insert studs fully into the body and tighten by hand
- Fit the BX seal to the groove and retain with some grease
- Fit flange crossover to flange sub (ensure bottom seal correctly positioned) and tighten down into place with hex nut to a torque of 319lbft (429NM)
- Screw valve seat into body
- Fit P-seal to valve, and screw into body, retaining with the Tamperproof button screw and washer.
- Fit o-ring and back up to saver sub and refit using cap screws and washers.
- Fit thread protectors

5.4 Maintenance Record Sheet

Date Performed	Type of Maintenance	Performed By	Verified By	Comments

Example

Table 2: Maintenance Record

6 Testing

All testing is to be carried out in the designated test area and by suitably qualified and competent personnel.

WARNING: Trapped air requires considerable time to compress and when it is compressed is highly dangerous. It has enough stored energy to separate parts with considerable force.

- On completion of reassembly fit the appropriate test caps to either end of the pump in sub and to flange crossover
- When making up the Phuel 15”-2 connection, the collar should be fully made-up and then backed off a **maximum of a 1/4 turn**.
- Fill with test fluid and bleed off any air in the system
- Apply a pressure of 500 psi and ensure pressure holds for a minimum of 10 minutes
- Increase pressure to Maximum Working Pressure, allow to stabilise and maintain this pressure for 15 minutes with no visible leaks. (Testing to be carried out to Test pressure when decreed by maintenance schedule)
- Bleed off pressure, drain test fluid and dry
- Remove test caps
- Apply coating of de-watering solution to protect the bore and threads
- Fit thread protectors

On completion of all maintenance ensure the maintenance record sheet (Para 5.4) is completed

7 Parts List and Drawings

Item	Part Number	Description	Qty
1	165-4888-480	BODY 15-2 X 2-1/16 BX	1
2	110-2982-411	SPLIT COLLAR 15-2 (SPLIT TYPE)	1
3	110-2983-411	SPLIT RING 15-2	1
4	110-2986-480	SAVER SUB (15K WP)	1
5	190-2823-PEK	VALVE SEAT	1
6	110-3127-316	HP ISOLATION VALVE	1
7	801-0114-V90	O-Ring - B.S Size 114	1
8	801-3126-PEK	BACKUP (114)	1
9	802-4813-H85	PISTON P-SEAL (0.456)	1
10	WNL-0580-316	WASHER NORDLOCK (M12)	10
12	SHC-0585-AL7	SOC HD CAP SIZE 1/2 LENGTH 1"	10
13	STC-0542-316	3/8" X 1/2" TAMPERPROOF BUTTON HEAD SCREW	1
14	WNL-0540-316	Nord Lock Washer Size 3/8	1
15	950-4978-STL	ADAPTOR 2-1/16 15M FLG X 2" FIG 2202 F	1
16	950-2164-STL	API SEAL BX 152	1
17	195-4979-AB7	STUD 7/8-9 UN X 4 LONG	8
18	HNC-0700-A2H	HEX NUT 7/8 UNC	8
20	803-3202-V90	SPRING SEAL FOR 15-2 CONNECTION	2
100	910-4682-N66	PROTECTOR 15.00-2 PIN (MALE)	1
101	910-4681-N66	PROTECTOR 15.00-2 BOX (FEMALE)	1
102	910-4027-N66	PROTECTOR 2" 2202 FEMALE	1

Table 3: Parts List 165-4846-HV0

***Note**: Thread protectors not shown on Assembly Drawing*

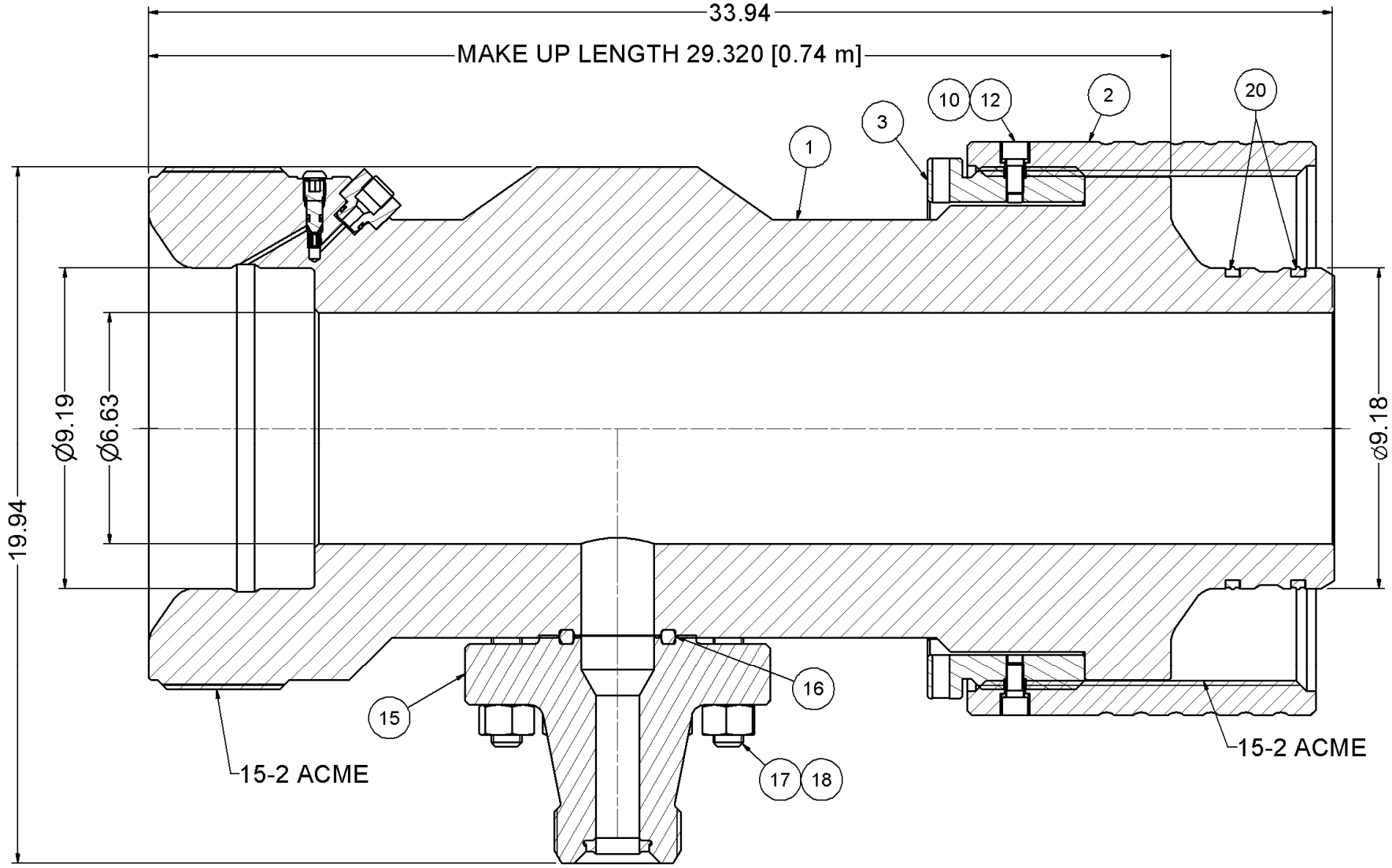


Figure 5: Assembly Drawing 165-4846-HV0 (Part 1)

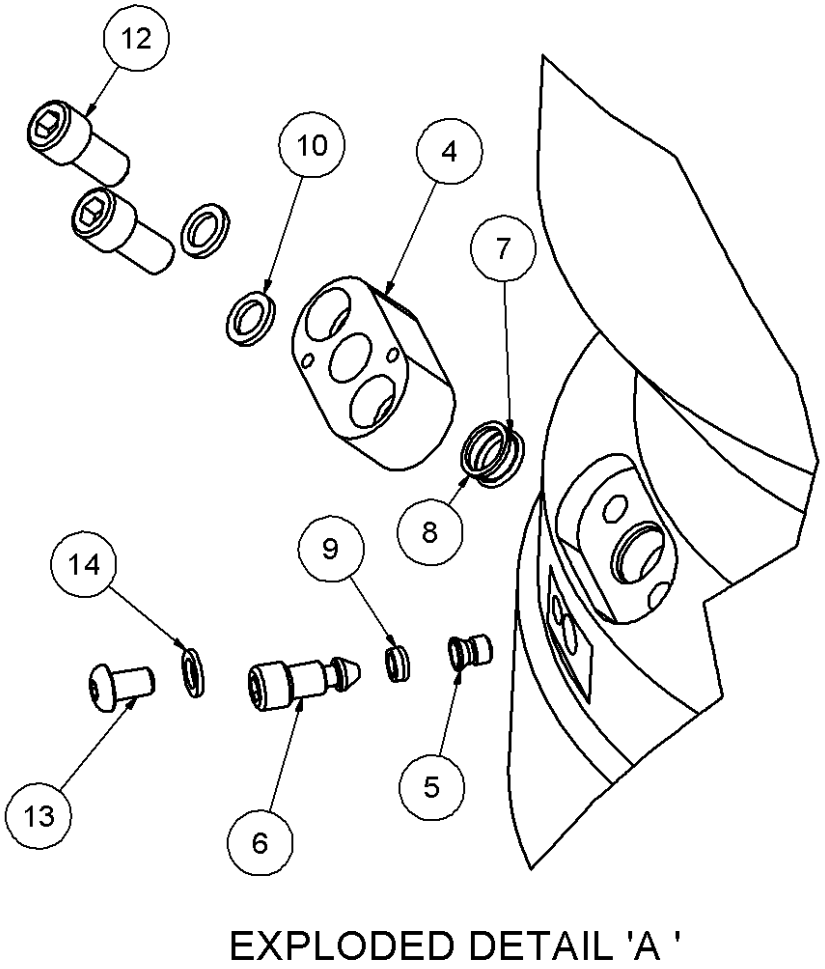


Figure 6: Assembly Drawing 165-4846-HV0 (part 2)

8 Spares

Use only spares supplied or approved by Phuel Oil Tools Ltd.

It is recommended that sufficient quantities of the following spares be maintained to ensure that the equipment is always available when required.

Elastomeric spares are supplied in Viton and HNBR material as standard. Many other materials are available please specify when ordering.

Part No	Qty	Description
190-2823-PEK	VALVE SEAT	1
801-0114-V90	O-Ring - B.S Size 114	1
801-3126-PEK	BACKUP (114)	1
802-4813-H85	PISTON P-SEAL (0.456)	1
803-3202-V90	SPRING SEAL FOR 15-2 CONNECTION	2

Table 4: Redress Kit Part No RDK-4846-HV0

8.1.1 Individual Items

Individual items may be ordered as required using the part number specified

Note: O-Rings conform to industry standards and may be substituted with those from other suppliers -– **at the sole risk of the user**.

8.1.2 Special Tools

General workshop tools will be required to maintain, and assemble and disassemble the equipment.

The tamperproof screws require a special tool to undo them:
950-4951-STL - Tamperproof Hex Key